

IN THE CLAIMS

1. (Currently amended) A vibrator comprising;
a piezoelectric sheet;
internal electrodes formed on both sides of the piezoelectric sheet;
cover layers formed on both sides of the piezoelectric sheet including the internal electrodes formed thereon;
external electrodes connected to the corresponding internal electrodes; and
vibration grooves disposed on a portion of the respective internal electrodes, wherein the piezoelectric sheet is fabricated by forming a sheet of slurry, and the vibrator is fabricated by simultaneously sintering the piezoelectric sheet and the cover layers, and each of the cover layers is formed with a burning passage communicating with the vibration groove.

2. (Previously presented) The vibrator according to claim 1, wherein the vibration grooves are disposed in the cover layers.

3. (Previously presented) The vibrator according to claim 1, wherein the vibration grooves are disposed between the piezoelectric sheet and the cover layers.

4. (Previously presented) The vibrator according to claim 1, further comprising first and second surface external electrodes, which are formed on a surface of said cover layer, and each of which is connected to each of the external electrodes, and a third surface external electrode, which is formed in the middle of the surface of said cover layer, and which is not connected to the external electrodes, wherein the extreme outer cover layers of the vibrator are dielectrics.

5. (Previously presented) The vibrator according to claim 1, further comprising at least one dielectric sheet, in which internal electrodes are formed, wherein said dielectric sheet is laminated and combined on the upper portion and/or the lower portion of the vibrator.

6. (Original) The vibrator according to claim 5, wherein the vibrator is three-terminal type, that is, said external electrodes are connected to the internal electrodes of the

piezoelectric portion and a capacitor portion in both ends and in the middle of the vibrator, respectively.

7. (Withdrawn) A method for fabricating a vibrator comprising steps of:
fabricating plural piezoelectric green sheets if slurry having desired composition;
forming first upper and lower cover layers by forming through-holes in predetermined sheets of the green sheets;
providing predetermined sheets of the green sheets as a vibration active sheet and second upper and lower cover layers;
forming an upper internal electrode between the vibration active sheet and the first upper cover layer and a lower internal electrode between the vibration active sheet and the first lower cover layer;
laminating said first upper and lower cover layers on the upper and lower portions of the vibration active sheet, respectively, and laminating said second upper and lower cover layers on the upper and lower portions of the first upper and lower cover layers, respectively;
simultaneously sintering the laminate; and
forming external electrodes, each of which is connected to each of the internal electrodes, on said laminate.

8. (Withdrawn) The method for fabricating a vibrator according to claim 7, wherein said step of forming the first upper and lower cover layers comprises a step of filling at least one through-hole of the first upper and lower cover layers with organic paste, and said step of simultaneously sintering the laminate comprises a step of removing the organic matter by heat treatment.

9. (Withdrawn) The method of fabricating a vibrator according to claim 7, wherein said step of forming the internal electrodes comprises a step of printing the upper and lower internal electrodes on the upper and lower surfaces of the vibration active sheet.

10. (Withdrawn) The method of fabricating a vibrator according to claim 8, wherein said step of forming the lower internal electrode comprises a step of printing the lower internal

electrode on the first lower cover layer which is filled with the organic paste.

11. (Withdrawn) A method of fabricating a vibrator comprising steps of:
fabricating plural piezoelectric green sheets of slurry having desired composition;
forming a lower cover layer by printing a vibration groove organic pattern on a predetermined sheet of the green sheets with organic paste and forming a lower internal electrode thereon;
forming a vibration active sheet by forming an upper internal electrode on a predetermined sheet of the green sheets and forming a vibration groove organic pattern thereon;
providing a predetermined sheet of the green sheets as an upper cover layer;
laminating said lower cover layer, said vibration active sheet, and said upper cover layer in the order thereof;
forming the vibration grooves by heat treating the laminate to remove the organic matter and simultaneously sintering the laminate; and
forming external electrodes, each of which is connected to each of the internal electrodes, on said laminate.

12. (Withdrawn) The method for fabricating a vibrator according to claim 8, wherein said cover layers comprise through-holes for burning passages through which the organic matter is communicated with an environment.

13. (Withdrawn) The method for fabricating a vibrator according to claim 7, wherein said external electrodes and external electrodes are formed by using thick film deposition, such as screen printing, or thin film deposition, such as sputtering, evaporation, chemical vapor deposition, or sol-gel coating.

14. (Withdrawn) A vibrator, wherein internal electrodes are not connected to external electrodes of the vibrator by controlling the pattern of internal electrodes in the vibrator.

15. (Withdrawn) A vibrator comprising:
a laminated element of at least two piezoelectric sheets;

internal electrodes formed between the laminated piezoelectric sheets; and
external electrodes formed outside the laminated element; wherein the internal electrodes are not connected to the external electrodes by controlling patterns of the internal electrodes.

16. (Withdrawn) The vibrator according to claim 15, wherein each of the external electrodes is formed on each of the upper, lower and side portions of the laminated element.

17. (Withdrawn) The vibrator according to claim 15, further comprising insulators on the upper and lower portions of the laminated element, wherein a vibration groove is formed on the insulator.

18. (Withdrawn) The vibrator according to claim 15, further comprising conductive passages, which pass through the laminated element and are not connected to the internal electrode, and each of which is connected to each of the external electrodes.

19. (Withdrawn) The vibrator according to claim 17, further comprising three-terminal electrodes provided on a surface of the insulator on which the vibration groove is formed, wherein the insulators comprising dielectrics function as capacitors.

20. (Withdrawn) The vibrator according to claim 15, comprising at least one dielectric bonded to the laminated piezoelectric element.

21. (Withdrawn) The vibrator according to claim 20, wherein the dielectric substrate, which functions as a capacitor with terminals, is installed on the lower portion of the laminated element, and a protective cap for protecting elements is installed on the upper portion of the laminated element.

22. (Withdrawn) The vibrator according to claim 15, wherein a dielectric substrate, which functions as a capacitor with terminals, is installed on the lower portion of the laminated element, and a protective cap for protecting elements is installed on the upper portion of the laminated element.

23. (Withdrawn) The vibrator according to claim 15, wherein an insulating substrate where the external terminals are formed is installed on the lower portion of the laminated element, and a protective cap for protecting elements is installed on the upper portion of the laminated element.

24. (Withdrawn) The vibrator according to claim 17, wherein the laminated element and the insulators are green with epoxy for protecting elements.

25. (Withdrawn) A method for fabricating a vibrator comprising steps of:
fabricating piezoelectric green sheets of slurry having desired composition;
forming internal electrodes, which are not connected to external electrodes, on the green sheets;
laminating at least two of the sheets on which the internal electrodes are formed;
sintering the laminate; and
forming external electrodes, which are not connected to the internal electrodes, outside the laminate.

26. (Withdrawn) A method for fabricating a vibrator comprising steps of:
fabricating piezoelectric green sheets of slurry having desired composition;
forming through-holes at both ends of the green sheets;
forming internal electrodes on the green sheets so that the internal electrodes do not come into contact with the through-holes and are not connected to the external electrodes while said through-holes are filled with conductive paste;
laminating at least two sides of said sheets;
sintering the laminate; and
forming external electrodes, which are not connected to the internal electrodes and are connected to the conductive paste of the through-holes, outside the laminate.

27. (Withdrawn) The method for fabricating a vibrator according to claim 25, wherein said internal electrodes are formed on a partial or near complete surface of the sheets so that the

internal electrodes are spaced from the edges of the sheets.

28. (Withdrawn) The method for fabricating a vibrator according to claim 25, wherein said internal electrodes and external electrodes are formed by using thick film deposition, such as screen printing, or thin film deposition, such as sputtering, evaporation, chemical vapor deposition, or sol-gel coating.

29. (Currently amended) The vibrator according to claim 1, wherein at least one of the cover layers comprises a first cover layer provided with a through-hole for the vibration groove and a second cover layer covering the through-hole.

30. (Currently amended) The vibrator according to claim 29 1, wherein the ~~second~~ cover layer comprises a burning passage ~~communicating with the through-hole~~ is filled with epoxy.